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DISEASES of the NERVOUS SYSTEM

(PUBLISHED MONTHLY)

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Integration of Constitution and Environment in Psychiatry and Psychotherapy*

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The psychiatrist studies personalities from a dynamic point of view. This does not mean that the dynamic approach is restricted to the analysis of the driving psychological forces. However, "dynamic" has become synonymous with psychologic. It is with mixed feelings of distrust and uneasiness that psychiatrists introduce factors of constitution into a case study. If, after what is believed to be a "dynamic approach" has been exhausted and found wanting, "constitution" becomes an insecure refuge. It is usually enumerated among other factors in chapters dealing with the etiology in psychiatry. It is given lip service but has remained somehow a foreign body, a lifeless concept. It has not been made use of in case studies because it has not found its integrated place. Ross[1] in "The Common Neuroses" merely mentions constitution and calls it the unknown factor believed to be inborn. How tangible this factor is and how intimately constitution is interwoven in the play of dynamics has not been realized. In psychoanalytic case studies it has been disregarded entirely. It is apparent that the dynamic and constitutional viewpoints are often thought to be contrasts. We read in Cleckley's[2] vivid discussion of the psychopathic personality: "At present, the writer strongly believes that the psychopath's life pattern can be more profitably considered from the viewpoint of dynamic psychology than from the futile viewpoint indicated by merely postulating an imaginary constitutional inadequacy."

Indeed it is not a question of "either/or." Both viewpoints must be integrated for they form an inseparable unit. It is important in the scientific approach to psychiatric problems to understand how this integration takes place when we attempt to understand the causes of abnormal behavior (and also in examination of normal behavior) analysis of dynamics without consideration of constitution is fragmentary, leading to false conclusions. Such a study would assume that life experiences have the same effect on development and reactions in every individual. We know this is not so. The response depends on the individual personality make-up which is partly based on constitution. For the same reason it is not advisable to contrast static constitutional types of reactions with psychodynamic reactions. The former types do not exist and in the so-called psycho-dynamic reactions the constitutional factor is just as

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important a consideration as in understanding the variety of normal behavior.

This is even more evident in psychogenic than in physiogenic reactions. An electric current of a certain amperage and voltage will produce an epileptic convulsion in every individual if the electrodes are fixed on the skull in a manner that the current passes through it. In contrast there is not a specific conflict or experience of any kind which necessarily produces an abnormal mental reaction in every individual and if it does, the types of reaction vary extremely with the personality make-up. The justified endeavor to appreciate and treat personality as a whole has created the unjustified tendency in psychiatry to abandon the distinction between psychogenic and physiogenic. These terms are scoffed at as dualism. The mind-body problem is thought to be non-existent. Muncie,[3] e.g., speaks of "the unnecessary enigma of mind-body." However, he discusses psychosomatic relations and uses the terms physical and mental. Obviously it is impossible to get along without them if psychiatrists want to understand each other. Of course we are dealing with abstractions. We must study the behavior and dynamics of the integrated psychosomatic unit, which we call personality, as a whole, if we would understand psychological or psychopathological phenomena. Nevertheless, the mind-body problem exists in the sense that mental and physical phenomena are á priori different categories in our aspect of the personality. A thought and peristalsis of the stomach do not belong to the same universe of experience, nor is there the same environmental stimuli when an individual receives a blow on the head or is disappointed in love. Therefore, the distinction between psychogenic and physiogenic must be upheld for logical as well as practical reasons.

It is an essentially different state when spirochetes invade the brain and produce lesions manifesting themselves in an abnormal mental reaction or when in another case a psychological conflict results in a hysterical manifestation. The practical importance of the etiological distinction lies in the modification of the therapeutic approach. Naturally we will very frequently find a combination of physiogenic and psychogenic factors involved in the abnormal mental reaction. However, we cannot look upon them as coordinated. Their pathogenic significance is of a different order in every case. The structure analysis of the individual reaction in this respect is of the greatest practical consequence for therapy. Since the existing causes of mental reactions will not be solely physical or solely emotional in their operation, Strecker[4] has stressed the terms preponderantly somatic or preponderantly psychic or emotional causes.

By omitting the constitutional factor in the personality make-up one would assume that the development of mental traits is conditioned entirely by environmental influences. The germ plasma would be thought of as amorphous neutral plastic matter to be molded by external stimuli. Yet nobody would venture to consider physical traits as being purely environmental products. Treatment of physical and mental traits differently in this respect would be contradictory since personality is generally looked upon as an integrated psychosomatic unit. Obviously such an attitude manifests an unrealized return to the dualism of the romantic period in psychiatry when body and mind were thought of as two entities with separate existences.

The term "constitution" is used with two different meanings. In the sense of personality make-up, i.e., the type of psychosomatic structure determining the individual reaction to physical or mental stimuli and the disposition to disease, and in the sense of the germinal basis with its genetic endowment. We refer to the latter meaning when using the term. The personality make-up then is a product of germinal basis and environment. Environment modifies the evolution of the organism from the uterine development until death. Constant intimate interaction of both form it. The one has no significance without the other because the germ plasma cannot exist without an environment, and the molding forces of the latter are not thinkable without the presence of something to react upon. However, this process of mutual interaction cannot be understood mechanically. Inherent in the germ plasma is an active principle—the idea, the pattern which unfolds itself like a bud towards which the organism develops, is the essence of life.

The constitutional element of the personality make-up is inherited. This fact should

not induce us to anticipate that abnormalities in behavior are inherited as such. They are merely the means by which the maladjusted individual copes with life. It is not accurate to consider addiction to alcohol as inherited. Nevertheless, the underlying maladjustment has also constitutional reasons. "Our parents do not endow us with characters. They endow us with genes," states Hogben.[5] The germinal endowment from a certain progenitor need not be abnormal or inadequate. It may be disharmonious in the germ plasma constellation of the descendant, irreconcilable with the setting of other inherited traits. It may provide thereby, the constitutional root for difficulties in adjustment. In the personality structure of individuals manifesting abnormal reactions we frequently find contrasting tendencies which have constitutional roots.

The environment constitutes the totality of physiogenic and psychogenic effects by extrinsic agencies. The response to physical stimuli and even more so to psychic stimuli is never the same in two individuals. Overly strict parents may develop an attitude of protest in one child and a hypertrophied superego in another. Here is the place where the constitution has to be considered and that the physiological structure is the result of interaction between the genetic equipment inherent in the fertilized ovum and the extrinsic environmental situation in utero and after birth. Also certain manifestations of primitive behavior instincts appearing later in life in a certain environmental configuration are generally acknowledged to be hereditary. Nevertheless in view of these facts the human new born is still treated as tabula rasa in the evaluation of character, as if the specific setting of extrinsic agencies could create any type of character in every individual. Referring to the newborn child, Weiss and English[15] have written: "The brain which serves as the area of the body in which the personality gradually takes shape, is like a clean slate ready to be written upon by experience, or, viewed in a three-dimensional way, a bare plot of ground upon which an edifice will be constructed."

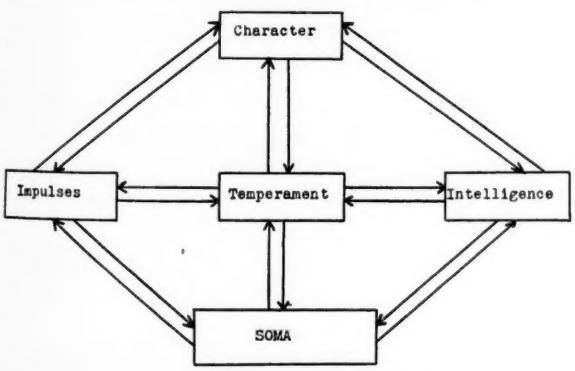

Figure I

Figure 1 pictures the interrelationship of certain psychosomatic aspects of the personality. Of course, we do not regard the personality as divided into realms or provinces. It enters into every experience as a unit. These divisions are abstractions, aspects of the personality, necessary for mutual understanding in the attempt to differentiate and analyze personalities. Obviously they have actual validity. We are confronted with them through the ages in the most divergent systems of psychology.

The character expresses itself in the behavior, the attitudes and reactions to life situations. It indicates the direction and goal of striving. Important constituents in the development of the character are the impulses, the temperament, and the intelligence. Impulses are ultimate biological urges striving for satisfaction. The concept of impulses can readily be comprehended through the example of the sex drive. The impulse is open to somatic or mental arousal, e.g., aphrodisiac drugs can stimulate sexual libido as well as erotic pictures. Temperament comprises a group of characteristics pertaining to the emotional side of the personality. It includes the fundamental life mood colored by the vital energy (the biotone of the personality), the innate rhythm or tempo of activity and emotion with regard to capacity for excitement, depth or resonance and expression. Eugen Kahn[6] has analyzed abnormal personalities with regard to specific abnormalities in their impulse, temperament and character structures.

The factor of evidence that the germinal basis is important to these manifestations of the personality (which together constitute the mental make-up) is supplied in the same way as for the physical structure. It is the finding that impulses, temperament, intelligence, and character are deeply anchored in the somatic stratum. They center around the knowledge that differences in morphology and

physiology of the organism express themselves in differences in the mental aspects of the personality. Hypothyroidism or other dysfunctions of the endocrine system find their expression in abnormalities of temperament and impulses. We do not imply, however, that endocrine dysfunctions are necessarily caused by the specific structure of the germinal basis. The intra-uterine as well as the postnatal environment may furnish the etiology. These examples merely demonstrate how abnormalities of the organisms have their physical and mental aspects and, therefore, causation factors accepted for the first cannot be disregarded for the second.

Richter[7] has made a valuable contribution to the problem of innate activity capacities and desire for food in experimental animals which translated into human psychology would be components of temperament and impulse. He studied spontaneous motor activities of rats by the use of revolving drums. The presence of rhythmic fluctuations in the running activity was demonstrated. At the peaks, occurring four days apart, the rats ran as much as ten miles daily and only one half a mile daily between the peaks. The peaks coincided with ovulation. Variation in activity was distinctly related to certain endocrine glands. Their removal abolished completely the normal rhythm with great reduction of total activity. The glands affected activity in the following order: hypophysis, the adrenals, the gonads, and the thyroid. Sections of the pituitary stalk and thyroidectomy, caused remarkable changes in appetite for food and water. Replacement therapy was successful in reestablishing the normal activity curve. Applying his observations to an understanding of human behavior, Richter sees activity in the human being as the resultant of three factors, "first: The situation, available outlets, opportunities, urges, etc.; second: the internal drive or push to activity, and third: the organization of the individual, his habits, integration of interests, abilities, etc."

These factors should be thought of not as merely coordinated, but as closely interrelated. The innate drive to activity will provide outlets and opportunities. It will influence the organization of the individual, his habits and color, the integration of interests. This explains what the mutual interaction of constitution and environment means. It can be readily understood that the germinal endowment furnishes potentialities which the environment develops or frustrates. That constitutional factors are equally active in forming the individual's environment as illustrated above is usually not appreciated. Environment is not a static, unchangeable quantity.

The correlation between physical and mental makeup manifests itself in some definite parallelism between the physique and the character as a whole. This has been scientifically established by Kretschmer.[8] Stockard[9] goes further and points out that the more physically similar individuals are, the closer akin are they mentally. Twin studies confirm this statement. Rosanoff, Handy and Rossanoff[10] studied behavior problems in twins. The pairs were divided into three groups; monozygotic twins, dizygotic twins of the same sex, and of the opposite sex. In the first group there were 47 pairs, and 87 per cent of these pairs manifested behavior problems in both twins; in the second group there were 60 pairs, with behavior difficulties in 43 per cent of both twins; and in the third group of 29 pairs only 27 per cent of both twins presented problems. In addition this analysis of a total of 136 pairs of twins proves convincingly that the germ plasma endowment is at least equally responsible for behavior as is the environment. The great difference of 87 per cent in the first and 43 per cent in the second group cannot be explained by environmental factors alone.

Newman, Freeman, and Holzinger[11] have also expressed the belief in comparing monozygotic and dizygotic twins "that a difference in environment is doubtless not a major cause of difference in traits." They had compared the degree of likeness of 50 pairs of identical and fraternal twins, both sets having been reared together.

Of extreme importance is the material which the above authors collected on identical twins reared apart. They did this in order to evaluate the effects of constitution and environment on the development. The twins were subjected to a battery of psychological tests. Differences in results were taken as indicators for the degree of difference in personality traits. In addition they attempted to establish correlations between the degree of variety in environment and in personality traits. We quote from their conclusions: "For

any particular genetic and environmental setup it is possible by the methods presented in this book to determine what fraction of the variance is due to genetic or to environmental differences. In another setup this fraction will undoubtedly vary. We feel in sympathy with Professor H. S. Jennings' dictum that 'What heredity can do, environment can also do.'"

The authors were critically aware of the difficulty of their task and of the possibilities for varying interpretation of the results. They recognized that the pre-natal environment might be equally important if not more so than the post-natal environment for the formation of differences in identical twins. The authors themselves differed somewhat in the emphasis placed upon pre-natal and post-natal factors. In the final evaluation, however, the factor of pre-natal environment was not taken into consideration. This omission cannot be overlooked in an attempt to approach the problem with mathematical exactness as the authors have done. This type of approach is problematical anyhow in a subject, the constituents of which cannot be measured with any degree of exactness. In certain of the cases the role of the pre-natal environment appears obvious.

The authors pointed out the fact that: "If we eliminate some half dozen pairs from the separated cases the average differences of the remainder are about the same as those of the unseparated group." Marked difference in intellectual ability and in educational achievement was present in their cases, I, II, IV, VIII, XI, and XVIII. In Case I, Alice was intellectually inferior and we read about here, "at birth Alice was very weak and it was thought that she might not live." In case II, the difference in height was 1.1 inches. In case IV, the height difference was 1.5 inches. In case VIII we are fortunate to have a report on the birth weights. Ruth, the intellectually inferior, (Stanford-Binet I. Q. 77) weighed at birth 3½ pounds while Mildred, the intellectually normal twin (S. B. I. Q. 92) weighed six pounds. The pre-natal disadvantage of Ruth is obvious. The authors remark in the discussion of this twin pair: "Ruth shows lack of vitality." In case XI, we find again a difference of 1.1 inches in height. The twins in case XVIII differ extremely in intellectual ability and educational achievement. Reece, the inferior, has a left arm two inches shorter than right. In addition the arm is slightly deformed. Both twins show a tremor in their handwriting, more marked in the handwriting of Reece. The authors state, "This doubtless has a physiological basis."

In reviewing these six cases we see that in case I and VIII the inferior twin had a quite obvious pre-natal disadvantage. The correlation between adverse pre-natal condition, e.g., unsatisfactory blood supply and inferior intelligence in one of identical twins is known. In case XVIII it is reasonable to assume that both twins had an organic brain lesion which produced greater defects in Reece leading to mental deficiency. (S. B. I. Q. 77). In case II, IV, and XI, we find differences in height ranging from 1.1 inches to 1.5 inches.

The authors attempt to explain these wide differences in intellectual ability and educational achievement by environmental factors of educational, social, cultural, or economic nature. The explanations vary in every case and if one cause cannot be blamed for the inferiority another is substituted. In other words, a certain factor may be called advantageous for the intellectual development in one case and a detriment in another. There is no set rule to be found in the explanations. To be sure the intellectually superior twin frequently had a longer and more successful schooling. But here again the individual creates his environment to a large extent. If a child is bright and gets along well in school, it has, under equal circumstances a better chance to be kept in school and the desire to get education will manifest itself even under adverse conditions.

With regard to intelligence, therefore, one can agree with the dictum that "what heredity can do environment can also do," only, if one wants to include gross physical factors. A head injury or a meningitis, e.g., may seriously retard the child's intellectual development. The importance of birth injuries and adverse pre-natal conditions, therefore, should not be questioned. But the problem confronting the psychiatrist, the psychologist, and the educator is mainly to know to what extent training, education, and modification of the cultural, social, and economic environment influence the intelligence of the individual. Here again the necessity, to distinguish between physiogenic and psychogenic factors

stressed earlier, becomes apparent. Physical agencies attack the personality at deeper levels and can change the structure entirely (Fig. 1). Of course, cultural and educational opportunities may enrich intellectual development to a great extent but they cannot do everything. To put it in plain words, a dull child cannot be transformed into an intelligent one however excellent the environmental opportunities may be. The potentialities for intellectual development are established already at birth. They comprise a limited range, inside of which the environment develops them to a greater or lesser degree. It is remarkable how little variation in test intelligence was found in the remaining 13 of the separated identical twins although the environmental differences were in many cases appreciable.

Erroneous belief in the omnipotence of the educational and cultural environment produces maladjustment every day. Individuals of low average intelligence or the borderline cases of mental deficiency are seen by the psychiatrist not so often because of their intellectual difficulties, but because they complain of headaches, dizziness, insomnia, fatigue and other neurasthenic symptoms. These are given commonly as the reasons why the patients fail in school or are inefficient in their work. Just the opposite is true. Their intellectual potentialities have been overtaxed. Constant failure, frustration, and disappointment drive them into the neurosis. These individuals can be happy, content, useful, and well adjusted on a level of activities in accord with their intellectual endowment.

What holds true for intelligence pertains also to the realm of impulses and temperament. They are constitutional as innate potentialities, modifiable by the environment within a limited range. Therefore, behavior, normal or abnormal, can be understood only if we consider both the constitutional endowment and the environment. Doubtless behavior is more modifiable by training, education, etc., e.g., the desire for sexual gratification can be sublimated, aggressive trends which might lead to anti-social attitudes can be made useful for social endeavor by environmental influences. This is one aspect of education and incidentally also of psychotherapy.

While intelligence and educational achievement can be measured by the tests applied in the study of separated twins, with a certain degree of reliability, measurement becomes questionable with regard to "character" in the above sense. The crucial test for behavior is the "experiment of nature" (Adolf Meyer). If we analyze the interesting life histories of the 19 pairs of separated twins from this viewpoint, we are struck by similarities of behavior beyond expectation. What the authors have evaluated as environment in some instances is obviously the environment created by the individual.

"It is probable, perhaps undoubtedly true, that great intellectual and personality development depends finally upon constitutional capacity. But even in this case, environment must offer opportunity and evoking factors," states Meyerson[12] in this respect. There is every indication to assume that many great capacities have never unfolded due to the fault of the environment. The role of both is always important but not identical. The constitutional endowment furnishes basic potentialities, the development of which can be frustrated by the environment or developed to the limit. This fact can be usefully absorbed into the science of personality and will become alive in the analysis of personality reactions only if the integration itself has a meaning. Studying the personality as a whole, we cannot stop at a mere enumeration of somatic and psychological, constitutional and environmental data. Mumps at 6 years, bed wetting up to 9 years, death of the mother at 12 years, unhappy love affairs at the age of 20 years, maternal aunt insane are data of heterogeneous spheres and not commensurable as such. The most complete, graphically presented life chart is of little significance unless one has succeeded in bringing order into the various data available and has uncovered their ramifications and meaningful connections.

Referring back to our diagram it is possible to visualize potentialities for psychosomatic as well as constitutional-environmental dynamics. It is obvious that the degree of psychic tempo or the coloring of the basic mood, temperament traits fairly constant throughout the life of the individual and somatically determined to a large extent, (as previously discussed) will mirror in the character. They will concur to determine the attitude towards

values in life, form certain perferences, influence activities and the choice of profession. The stream of thought associations is directed by the mood to a great extent. Associations in harmony with the mood are favored ideas; those in contrast to the mood are frustrated in their development. The periodical distortion of the mood in manic depressive psychoses gives us insight into the influence of the affect on the thought content. From these psychotic phases we learn also the correlation of depression and the feeling of inferiority or elation and the feeling of superiority towards life experiences. The same is true for the individual variation of temperament in the normal range expressing itself in a more asthenic or sthenic attitude. Thereby it cannot fail to color the individual's feeling of self appreciation and to play an important part in the formation of psychological mechanisms, compensation, repression, escape, withdrawal.

Looking at it from another angle, the degree of excitability, power of expression and depth of emotional resonance, the temperament reflects itself in behavior. Be it art, religion, or philosophy the temperament will be interwoven in the determinants. It is not at this point planned to analyze the foundations and correlations of the personality structure. We have touched on this subject only for the purpose of enlightening the constitution and environment relations in the personality. Naturally the individual drive structure and intelligence are not less important for character formation than the temperament. Finally, incongruities in the temperament-drive structure may give the basis for abnormal responses to environmental stimuli. A love attachment, for example, can bring them to the surface for the first time. If a strong sexual drive is contrasted to a highly developed super ego (conscience), the latter originating from a more depressed asthenic attitude and associated with the tendency for guilt feelings toward drive quests, a neurotic reaction may result. In fact every neurotic reaction has its constitutional as well as its environmental aspects.

Freud[13] was aware of this fact, but he ignored it in the development of his theory and therapy. The omission is one of the essential shortcomings of psychoanalysis. It has prevented psychoanalysis from penetrating the complexity of underlying causes of complexes. To be scientific any theory must attempt to reconcile all available facts in its conclusions. By ignoring the constitutional aspect in the personality study the therapeutic approach of psychoanalysis has become over-simplified and monotonous. The Oedipus complex, e.g., the sexually colored overattachment to the mother and antagonism towards the father is not a purely psychological problem—in our experiences an abnormal situation, and by no means the usual expression of the parent-son relationship, if one means a conflict in the above sense—is not purely a psychological problem. Biological factors are involved to the greatest extent. At puberty a phase of detachment from the mother ideal begins normally. Manifest sexual feelings set in with great intensity, but at this time they are not yet strongly fixed upon a clearly determined goal. If the detachment from the mother does not take place it signifies an arrest in the psychosexual development. The reasons may be certain factors in the family situation, an overprotective mother, too rigid restriction of contacts, etc. However, they may also be determined by innate abnormalities of the drive temperament structure leading to an overrigid super-ego or to abnormal shyness or to fear of the opposite sex. The need for affection may then remain fixed on the mother. Constitutional and environmental factors merge. Over-protection by the mother alone will not prevent normal development unless it coincides with some innate weakening of drive instincts.

Most psychotherapists including the psychoanalytical school have realized that bringing to the surface and making the patient conscious of repressed conflicts converted into neurotic symptoms does not cure a neurotic. The psychoanalyst Ferenczi[14] alludes to another phase of therapy saying: "The education of the ego on the other hand, is distinctly an active interference of which the doctor is capable because of the authority which has been heightened by the transference. Freud[12] does not evade calling this kind of influence 'suggestion,' but indicates the essential characteristics that distinguish this from non-psychoanalytic suggestion." There can be no doubt that transference facilitates suggestion, but it is not acceptable to call the process

of education "suggestion." This concept has a specific psychological meaning. Finally employing "the transference to make one's own conviction of the unconscious motive of the illness accessible to the patient" should not be the ultimate goal of psychotherapy. It is a necessary prerequisite, but alone it would be only a symptomatic treatment leaving the neurotic personality untouched. An important part of psychotherapy is to reeducate the neurotic by making him know himself more completely in other respects. He must learn to realize what his assets as well as his shortcomings and handicaps are and how to cope with them. He must be led to find a new evaluation of life and to direct his energies into more profitable channels for himself than the neurotic mechanisms.

Recognition of constitutionally founded deviations and incongruities in the drive and temperament structure are essential to the therapist since the phase of synthesis (reeducation) in psychotherapy will differ accordingly in every case. He must see the limitations and evaluate the possibilities of the "change of personality" that can be achieved when he determines the therapeutic goal. The analysis of the individual's reactions from infancy on will reveal a fundamental pattern although often hidden under psychogenic superstructures and mechanisms. A hypomanic temperament or the strength or weakness of impulses will not change under psychotherapy, but the goal of impulses is modifiable and dynamic disturbances can be resolved. In his attempt to adequately adjust a patient, the psychotherapist should take into consideration the patient's innate potentialities. He must penetrate beyond the unconscious motives to the causes of these motives. These causes can be understood and attacked successfully only if he analyzes individually the dynamic structure by integrating constitutional and environmental aspects in the study of the personality. This is equally important for the educator, the criminologist and the psychiatrist.

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Criteria for Psychoses

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In an earlier stage of his existence, man was more the stark materialist than he is today. It was necessary for him to deal with the simple facts which immediately surrounded him. He had no knowledge of what was either spatially or temporally removed from him. His was a world calling for direct action. He read no newspapers; he walked, looked and listened, until by his own physical efforts he had found out. Such intermediaries as the newspaper were non-existent. If he had a grievance against another individual, he could only go to that individual and smite him. He could not send a telegram a hundred miles and instruct his lawyer to sue.

It is almost an impossibility for us of today to realize to what an extent our present picture of things has changed. Hence it is difficult for us to appreciate from what a state of affairs this change has developed. We are too often content to accept things as they are, but it will be worth our while to investigate what has happened, and to recognize some of the results therefrom which have an especial meaning to the psychiatrist. What has happened is, that man has more and more trained himself to the use of long-circuiting processes in place of the phylogenetically older and neurologically simpler type of response to stimulus by immediate reactions. The result has been that instead of a single, abrupt, and hence decisive, response which would automatically fix a certain single value to a stimulating situation, man has become able to recognize multiple values of differing kinds which that situation contains or potentially implies. It is thus that alternative possibilities of action or of thought come into being, and that we have learned to weigh the "meaning" of things—that is, the possibilities of various responses and their relative importances to us.

While this is a step of great significance in the building up of a higher psychological or mental structure for mankind, there are other psychiatrically significant aspects to it. The capacity for dealing with various alternative possibilities is dependent upon the formation of mental conceptions, and in a strict sense, mental activity is a method of dealing with the non-present. The various possibilities, dependent upon one's selection of reaction, do not have to be carried into actuality, in order to make a decision. Instead, they themselves are not observed, are not experienced, but rather it is the psychological conception of them, the thoughts about them, to which we pay attention. The interposition of these added steps constitutes the long-circuiting process by which we attain the capacity for thought. We do it by a method which shifts our attention from the actualities of material, external realities, and places emphasis on an area with no location in space, no objective existence and no physical realness.

It is astonishing to realize how many of the daily activities of civilized man deal with material devoid of physical entity. We don our clothing; we eat our food; we attend to our toilet needs—but the greater part of the rest of our daily life is occupied by our consideration of symbols. We use language and pay heed to the words because of their meaning, not their noise as such. The office executive, hard at work, will for hours give no more heed to actual realities than perhaps to swallow some water if his throat is dry. Otherwise his concern has been chiefly centered upon machinery which is not yet built, or plans for an organization soon to be set up, or some other matter which is not actually present in his office.

As soon as we begin to consider such phenomena in comparison with the phenomena of psychosis, difficulties arise. If the mental patient is interested in a non-existent plot and the office man is interested in a non-existent machine, why should the one picture be regarded as psychotic and the other not? Our criteria for psychosis should be able to endure any inquiry we may wish to put to them. Let us check on some of them. First we think of the test of reality. Is it correct to say that one who is well deals with the real, while the psychotic deals with the unreal? Is psychosis to be defined as a mental state in which reality is distorted? This view

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has been often accepted, but it seems less defensible if it is subjected to scrutiny. If we take the term "the real" to mean "actual, present, physical existence," as the dictionary does, then as indicated above, it will follow that as civilization advances, man tends to live less and less in the real and to interest himself increasingly in the significance of symbols and in ratiocinations. This would say that our mental life, the "implicit behavior" of Adolf Meyer, is not real and hence that the check of reality would not in itself give a correct discrimination between mental health and psychosis.

The other side in the dilemma would admit that mental material, being truly present, is to be classed as existent and hence as being real. On this basis, the delusion that one is Napoleon would have as much existence and would be as "real" as would some nondelusional idea held by a well person. It is evident that reality is not a sufficient criterion, when taken alone. We do not regard the Napoleon delusion as psychotic simply because one creates it in his mind, but because we say it is "not so." But certainly this reasoning will not suffice. Democrats and Republicans deny the validity of each others' tenets, yet we would not consider such denial as evidence of psychosis. Neither does it suffice to make a distinction between our opinions as being fallible, and our presumed "facts" as being nonfallible, for Einstein, and Lobachewski have proved how erroneous may be our most accepted thinking. Yet we designate such thinking simply as "mistaken," not as "psychotic."

Factual error is not enough to make us diagnose psychosis, nor is erroneous belief, but erroneous conduct leads to our considering the possible presence of psychosis. If behavior is too different from the accepted standards, if one is a dissenter to such a degree that his conduct distresses too many people too much, then either criminality or psychosis will be considered as the diagnosis. This is a purely quantitative criterion, in which the decision is determined by the balance between the amount of individual divergence and the amount of social equanimity. Different degrees of tolerance will modify the tendency to assert the presence of psychosis, as the history of trials for witchcraft bears witness. All too often the mechanism for determining the presence of psychosis has been a matter, not of the subject's condition, but largely of the attitudes, the beliefs or the particular type of culture which prevailed. Peculiarity of conduct means difference of conduct from the existing mode. The clothing of a missionary is quite as eccentric a symptom to some central African tribe as is nakedness at Times Square. Psychosis must then vary from one culture to another, and from one state of mind in a community to another, as well as being a problem of the subject's own state of mind.

There are so many variables concerned in the production of the individual's state of mind that this fact also complicates the setting forth of any simple dictum for the pronouncement of a psychosis. Brower and Bannister wrote: "There is the standard of the individual. . . . Everyone thinks and acts in his own way, and thus there is formed a special standard of normality, which is made up of habits, social instincts, education, training, and more especially by those moral traits that constitute what we call character. In these respects the individual must be compared with himself—he must be tested by what he ought to be and by what he was in his normal condition—before an accurate decision can be arrived at in any case of suspected mental disease."

To apply this statement, reference need only be made to the difference in the motivating influence of a stimulus upon two individuals, one of them having a deficient and the other an excessive thyroid secretion. Such variations as hyperacidity or achlorhydria at the physiological level may entirely alter the stimulus value of an irritating psychological situation. The greater susceptibility of children to infectious hyperpyrexia makes them more liable to delirious episodes than are adults with similar bodily illness. Likewise changes from one time to another occurring in a given individual will alter the influence towards psychosis of a single factor. The person who had always successfully managed a fiery temper may be less able to do so when arteriosclerosis develops. Or one individual will remain mentally clear except during episodes of cardiac decompensation, and then will succumb in psychosis to strains which in another man would produce psychosis without that added burden.

Such individual differences are also impor-

tant in the realm of the instinct drives. The individual who is motivated largely by instincts acceptable in his culture maintains a very different inner state of balance from the individual whose instincts are opposed to the existing cultural patterns. The man with active homosexual instincts in Syria knows nothing of the tremendous burden of conflict and conscience experienced by a man of similar instinctual organization in this country. If they were subjected to some identical trauma, it would be understandable if one developed psychotic symptoms and the other did not. Again, the minister whose erotic drive caused him to be psychotic at thirty might have no such difficulty at the age of sixty.

Such examples support the thesis that the variants characterizing the mental activities of different age periods, different levels of experience, or subjection to the influences of different cultural patterns—all offer different bases from which departures into psychosis may take place. Neither quantitatively nor qualitatively can the process of becoming psychotic be circumscribed with any one of these formulae. To become psychotic must have varying significance when occurring under different conditions. It needs to be envisaged with a much more flexible understanding than has often been the case in the past. Psychosis is not merely a thing or a fact; it is a dynamic alteration which seeks to reestablish equilibrium with a new resultant among changing phenomena, both personal and environmental.

Ordinary conditions and the usual tempo of life allow considerable opportunity for one to build up fairly regular types of response to familiar patterns. One finds that life is more or less dependable and predictable, and that his reactions have certain customary demands made upon them if he is to win social approval and esteem, and these demands usually become part of his own psychology. He thus establishes a set of patterns in his own personality, by which his human strivings are curbed, or subdued, or released, according to the various pressures which reality has imposed upon him. If now he should begin to show traits in marked contradiction to his accustomed traits, if he should become cruel and dangerous to the lives of others, if he should abandon his business, his family, his usual recreations, and if he should stand in immobile position for long periods—then he might be thought of as psychotic, but his behavior might equally well be explained by the fact that he had gone to war.

The ideologies of war present, as in this illustration, some very definite similarities to those of psychosis. Both flout many of the usually accepted attitudes. They emphasize as being desirable trends which are ordinarily inacceptable, and they foster cruelty, destruction, deceit and violence. The individual who had previously established the orthodox peacetime conditionings in regard to such matters and who must now form completely different and contradictory sets of conditionings, is thus subjected to intense stress. Instinctive urges which had earlier been subdued as the price for mental health now acquire another value. It seems then, that the significance of the term "psychosis" must be re-evaluated, for insofar as the activities and aims of the individual at war are concerned, they are certainly antisocial and would certainly not be tolerated at any other time.

These considerations suggest that the individual psychosis need not necessarily devolve upon any one of various factors which are commonly regarded as indicating it. One's behavior seems strange to others if it is too different from theirs and this impression varies from one of eccentricity, through one of "problem conduct," to one of actual mental disease. But when one does what all the others do, it cannot seem psychotic to them. Psychosis is not a state of the individual which can be precisely delineated in and by itself. To us, the old belief that the world was flat is a distorted mental conception, untrue to fact, and appearing in those who hold it, as a delusion. When it was the general opinion, it was not a psychotic delusion. The commonly accepted notions held by certain cults about taboos, magic and rituals are normal to them, seem peculiar and erroneous to us, and would be regarded as psychotic material if held by an individual from our particular culture. When an attitude, however, comes to be accepted by the mass of individuals in the social group, it is lifted out of the realm of psychosis. It may be true or false if checked against the facts, but holding it is not a psychotic reaction. We tend nevertheless to regard such judgments rather naively, as if to differ from the ways we consider right and

proper were the real desideratum.

The question is often raised as to whether war itself is a form of psychosis, a group of symptoms in a patient who is the combined social structure of mankind. A parallel can be drawn between the sociological group and the individual. We may think of the orderly, efficient, peacetime activities of society as analogous to personal health. Just as one has in him always the elements of stress and the instinctive drives which need to be kept in proper check, so does society. Its continuing strain, its problems of criminality and law enforcement, its outbreaks of strikes—all are in need of regulating control, the success of which causes continuing effectiveness and general comfort. The occurrence of war is an outburst of partial trends, for at the same time society tries to maintain as far as possible its customary levels of behavior. War compares with the breaking forth of an individual's tendencies, which in him is thought of as indicating a psychotic involvement.

It may be objected that war is serious business which deals with real problems, and that it is conducted by an organized social group working consistently in a very purposeful effort. But the clinician can assert exactly the same state of affairs in the case of his patient who in an acute homosexual panic becomes aggressive, has a very troubling problem which disturbs his comfortable adjustment, and may have his composure destroyed by his partial tendencies. With each alike, there is a sort of behavior both in mental attitudes and in conduct, preventing the most efficient and the most happy adaptations which might otherwise be possible. This criterion meets the definition for psychosis offered by the Columbia Encyclopedia, which seems as satisfying as any, to the effect that psychosis is a mental disorder involving failure to adjust oneself to the conditions of his environment as they really exist.

Herein may lie an answer to the various difficulties touched upon by this discussion: "Conditions of the environment as they *really* exist." Efficiency in the living of life is not necessarily sacrificed by our increased tendency to interest ourselves in the realm of symbolisms and concepts and meanings, and to spend so much of our time in dealing with things which, strictly speaking, are not actual or real at all. As long as one still manages to live in harmony with those things which *are* real in the physical world, the requirements for mental health may be met. It is not necessary to demand that one should have no fantasies, build no air-castles. Thought and reasoning are all fantasy—that is, they are not real in the sense of a material, physical world. It would therefore be inappropriate to require that they follow completely the inexorable logic of physics. For them to align themselves to a considerable extent with the dictates of the instinct drives is inevitable and hence must be regarded as normal.

It is necessary, however, that cerebration and judgment should coordinate closely with material realities and take correct evaluations of their characteristics so that life will be lived in harmony with those physical facts. Our fellow humans are some of those facts, and it is just as important to deal with them and their qualities realistically as it is with a hot stove or a runaway locomotive. When an individual changes, after having learned to make his reactions comply effectively with the various external things around him, changes so that his reactions comply with his own internal situation rather than with them, then it is that we should pronounce him psychotic. This is equally true whether the problem is due to his instinct pressures or to paresis, for in each case the fundamental psychic issue is the same. It may be produced in two ways. The first one already mentioned is a greater insistence upon response to the interpersonal factors. This may be due to psychobiological stress such as the demands of instincts and the force of emotional states or it may be caused by physical or physiologic or pathological alterations of the individual such as to disturb his adequate responses to the external world. The second way is by the lesser impingement of the external world upon the individual, as in sleep, so that dreams can occur, and these have aptly been called "little psychoses."

To return again to the question of war as representing a possible psychotic picture, it is plausible to suggest the same criteria for war, which is a form of behavior of society, or of various large social groups such as nations, as have been indicated for individuals. We may consider that war, like any other reaction of persons, is to be evaluated as being healthy, or as being psychotic, according to

whether it is being used as an adequate, realistic reaction to external fact, or employed for the purpose of expressing the national instinctual and emotional pressures without due regard to existing external facts. A war which is waged to permit ruthless exploits of mere cruelty, and to brandish the triumph of personal power regardless of cost or of meaning, and to give vent to lurid antisemitism, and to use its own people as dupes or compulsory victims to the self-aggrandizing factor of the individuals in charge, may be diagnosed as a psychotic war. Such for example is Germany's war, in which reality relationships are less the motivation than are certain personal and national instinct urges of the type whose release is detrimental to the organized welfare of society. Our war, by contrast, is one whose focus is not upon instinct gratification, is not determined by an outbursting of those pressures which we ordinarily hold under temperate control for the good of the majority. Our war is to be classified as not being a psychotic phenomenon in our culture, because it is constructively concerned with the facts upon a reality basis instead of upon an instinct or craving basis of personal urges. It is a healthy reaction pattern, in that its objectives are those of harmonizing facts to the greatest stability, efficiency and happiness of society.

Ejaculata Praecox: Cause and Treatment

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Premature ejaculation is one of the most common and easily averted causes of male impotency. Not only is it an extremely embarrassing type of inadequacy but it is prolific of personality maladjustments resulting from feelings of inferiority and frustration. After a few humiliating experiences in which he finds himself incapable of completing (or even beginning) normal sex relations, the average sufferer from premature ejaculation develops a profound inferiority complex and loses all confidence in his ability to prove his potency. A vicious circle is established in which the more he worries and strives to overcome this shortcoming, the worse the inadequacy becomes until finally the patient gives up hope of ever being potent and resigns himself to a life of celibacy. The causes of premature ejaculation are obscure but may conveniently be differentiated into organic and functional groups. This paper deals with functional cases in which no neurological or endocrine defect can be demonstrated and which may be explained on a psychosomatic basis.

The threshold or limen of sexual excitability in the male is a complex function in which the following factors seem important:

a) Intensity of Erotic Stimulation. The more interesting and sexually attractive the object, the lower is the strength of stimulus necessary to produce orgasm

b) Intensity of the Male Sex Drive. Great variations in sex excitability exist, ranging from complete inability to secure erection to the other extreme of being in a constant or chronic state of excitement. The strength of the sex urge is complexly determined by many psychosomatic factors.

c) Sensitivity of Erotic Zones. Low thresholds of stimulation, either intrinsically (neual limens) or extrinsically (circumcision) tend to increase excitability and cause premature ejaculation.

d) Frequency of Sex Relations. The less frequent are sex relations, the lower are thresholds of excitability and the more quickly does orgasm occur. Frequent orgasm tends to raise the threshold of excitability.

e) Psychosomatic Factors. Fears, anxiety and morbid preoccupation with sex function exert subtle influences in producing unhealthy mental states which exaggerate the original symptom.

Through a careful evaluation of the role which these factors play in any individual

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case it is usually possible to offer a psychosomatic explanation for the mechanism of premature ejaculation without introducing hypothetical psychoanalytic or psychiatric interpretations.

It is important to recognize that almost any man is capable of having premature ejaculation if (a) he is sufficiently excited, (b) maintains an erection for a long period before attempting the act, (c) has not had relations recently and therefore has a low threshold, and (d) lacks confidence in himself and fears that premature ejaculation will occur. Careful questioning usually reveals that the patient has been celibate for several weeks, became aroused long before the act was attempted, and then was so embarrassed by impotency that confidence was lost and no further attempt was made until weeks later when the whole cycle repeated itself. After several repetitions of such an unsatisfactory performance, the feminine partner becomes critical and sarcastic with the result that confidence and masculine self-respect are further diminished. In extreme cases, frustration may become so great as to cause permanent celibacy or even to precipitate an acute psychotic episode.

Report of Typical Case Histories

The following cases have been selected to illustrate the typical history of this emberrassing symptom in patients with no demonstrable organic defect:

Case 1—C. R., age 47. A well respected and successful professional man with medical and psychiatric history essentially negative except for completely unsatisfactory marital relations caused by ejaculata praecox. On wedding night orgasm occurred before successful penetration following which the bride became disgusted and taunted him by comparisons with a former lover. This unfortunate performance was repeated thrice in the two week honeymoon and it was not until 4 months later that the first successful act took place. On most attempts both partners experienced a very unpleasant combination of excitement and anticipation of frustration which resulted in gradual alienation. Although 3 children have been born of this union, the wife has become contemptuous and exasperated and goes about proclaiming her husband's inadequacy in public. C. R. has progressively withdrawn into himself and is very unhappy and asocial at times.

Case 2—E. B., age 22. A university student who comes to the clinic because of fears that his marriage will be unsuccessful because "I always come in my pants" after a short period of "necking." Questioning reveals that he has a "hot" date once weekly which consistently results in premature ejaculation and much embarrassment over inability to continue the act to completion. Admits that another erection occurs in 20-30 minutes but then is not in the mood.

Case 3—N. C., age 34. An intelligent business man with negative medical and psychiatric history. Complains that his marriage is approaching divorce because of unsatisfactory relations. Wife originally receptive 4-5 times a week and relations were mutually satisfactory. After birth of first child wife began to show less desire and relations became fewer. Since birth of second child, relations at 6-8 week intervals and then unsatisfactory because of premature ejaculation. Husband began masturbating 1-2 times a week and accidentally discovered that successful relations occurred if the act took place shortly after an orgasm by masturbation.

Case 4—J. W., age 36. Graduate trade school in good health. Psychiatric history uneventful until 4 months ago when began to brood about being "all drained out" following unsuccessful attempt with prostitute resulting in premature ejaculation. Stayed home from work bothered by feelings of guilt over betraying his fiancee, and by hypochondriacal fears of impotency and insanity. One doctor gave him pills which did no good. Another doctor told him to get another woman but this attempt also was unsuccessful and was immediately followed by the development of an acute psychotic episode for which the patient was institutionalized.

Almost all cases report the common experience that the fervid suitor has spent many hours in passionate contemplation of the joys to be shared with his enamorata, and working up to a peak of excitement which is followed by the distressing anticlimax of premature ejaculation.

Discussion

Unfortunately, objective evidence is lacking concerning the psychosomatic factors related

to the most optimum conditions for masculine potency. Anecdotal evidence collected from university undergraduates and other devotees of Eros indicates that frequency of intercourse and ability to maintain an erection vary in geometric ratio. After each successive orgasm in one evening, the threshold of ejaculation becomes progressively higher until after 4 or 5 orgasms it is possible to maintain an erection almost indefinitely. Even though premature ejaculation may occur on the first attempt, he who persists is rewarded with increasingly persistent erections if he is merely patient enough to pause until desire replenishes itself. A hair-trigger mechanism would therefore appear to be the result of prolonged continence rather than any intrinsic defect in the mechanism of ejaculation.

Appreciation of the various factors determining the threshold of excitability suggests a number of practical devices for insuring potency. The use of a sheath tends to decrease penile sensitivity and is useful for functional as well as contraceptive purposes. Judiciously utilized, masturbation conducted a few hours before anticipated relations may raise the threshold enough to permit a successful act. Most important of all is the necessity of explaining to the patient that premature ejaculation is an understandable physiological phenomenon which does not invariably indicate an irremediable organic defect. The patient should be advised to wait a few minutes until desire returns and then to repeat the act with complete confidence of a successful outcome. The patient should be reassured concerning his masculinity and prevented from developing deeply ingrained feelings of inferiority and shame. It should be carefully explained that nocturnal emissions and premature ejaculations do not weaken the sex function and will not result in any loss of potency or fertility.

Conclusions

Premature ejaculation is most commonly caused by a combination of psychosomatic factors including intensity of erotic stimulation, intensity of the male sex drive, sensitivity of erotic zones, frequency of orgasm and other physiological factors. It is a relatively normal physiological phenomenon which is not an inevitable cause of impotency or loss of masculinity. It is frequently associated with undesirable personality reactions which may result in a profound inferiority complex or, rarely, in overt psychoses.

An analysis of typical cases reveals that premature ejaculation is commonly preceded by a long period of continence with gradually increasing excitement which results in a low threshold to sex stimulation and quick orgasm. Many cases of premature ejaculation may be effectively treated with simple psychotherapy and instruction concerning the normal physiology of the sex function.

Narcotic Drug Addiction, a Symptom of Human Maladjustment

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Much confusion and lack of understanding exist concerning problems centering around and arising out of drug addiction. Some of this is due to looseness and laxity in the use of terms. The principal terms to be defined are:

Addiction
Habit Formation and Habituation
Tolerance
Narcotic Drugs
Narcotic Drug Addicts
Physical Dependence
Abstinence Syndrome

Addiction is a term having broad applications and involving many types of activity. Persons addicted to fast driving contribute, in normal times, to the death of over 35,000 persons each year. Now, when slow driving is imperative, we still see them tearing along

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our roads, utterly unable or unwilling to exercise the self-control needed to postpone their arrival on what is probably a relatively unimportant errand. Many sufferers from thrombo-angiitis obliterans would rather lose parts of their bodies than abandon the use of tobacco. Overweight sufferers from hypertension or from some type of nephropathy are unable to exercise the amount of self-control over their eating required to reduce. We are all familiar with the individual who is not satisfied with eighteen holes of golf or several sets of tennis, but who without regard to his physical condition must play another round or several more sets. These persons are addicts, and may do themselves or others more harm than does the addict to some chemical substance.

In general an addict is one who has lost the power of self-control with reference to some practice or substance to the extent that his physical or mental adjustments are interfered with to the detriment of himself or of society.

Habit Formation and Habituation are also words of broad meaning, even broader than *addiction*. Our whole life is a pattern of habituation and habit formation; habits take care of our daily routine. It is only when a habit tends to interfere with a satisfactory life pattern that it becomes of interest to the psychiatrist.

Tolerance designates the fact that after a drug has been used for some time, the amount must be increased in order to obtain the original effect. To phrase it differently, the amount of a drug which can be administered without harmful or lethal effects increases with the length of time and amount of administration. Tolerance develops rapidly for the derivatives of opium. We do not know what the limit of tolerance to opiates is; we have given as high as 70 grains of morphine sulphate a day with no untoward results.

Narcotic drugs as defined by Federal statute are: All derivatives of opium such as morphine and heroin and including such preparations as papaverine and narcotine; cocaine; Indian hemp, usually called marijuana, and peyote.

A *narcotic drug addict,* as defined by Federal statute, is a person who so habitually uses any of these narcotic drugs as to endanger the public morals, health, safety or welfare, or is or has been so far addicted to their use as to have lost the power of self-control with reference to his addiction.

By *physical dependence* is meant the physiological change produced when a person has taken a considerable amount of opium or of one of its derivatives (not all, because narcotine and papavarine do not have this faculty) for a considerable period of time. The result of this change is that if the administration of the drug is discontinued or the dosage drastically reduced, the person becomes physically ill. We are frequently asked if such and such a drug is addictive or if it is habit forming. These terms are so broad that such questions have no point. As a matter of fact the question means "Does the drug create physical dependence?" This condition has not been found following the use of cocaine, marijuana or peyote.

The symptom complex which appears when a person with physical dependence undergoes drastic reduction in his dosage is designated by the term *abstinence syndrome*. In the order of their appearance, the signs and symptoms of this syndrome are: Yawning, lacrimation, rhinorrhea, sneezing, perspiration, anorexia, goose flesh, tremor, insomnia, elevation in blood pressure and in temperature, hyperpnea, dilated pupils, restlessness, nausea, vomiting, diarrhea, weight loss, collapse, death. A point scale has been developed by our research group by which we can express numerically the intensity of the syndrome and the effect, if any, of alleged forms of treatment.

Various so-called "cures" for narcotic addiction have been brought forward, most of them having nothing to do with the reason the patient began the use of the drug originally and not being designed to prevent his return to it. They refer solely to some scheme for the allegedly painless relief of physical dependence, that is, treatment of the abstinence syndrome. As measured by their effect on the intensity of this syndrome, their effect is imperceptible.

Addicts will report that they have "taken the cure" a certain number of times. All they mean is that they have that many times been relieved of, or deprived of, their physical dependence or "habit" as they term it. The term "cure" should preferably be limited to the state of having regained self-control with reference to the use of a narcotic drug.

Why a person should become addicted to

any practice or substance is just one aspect of the problem of human maladjustment. We do not know why people *behave* so we should not try too facilely to explain why they *misbehave*. Whatever the causes of human misbehavior, there are a great many badly adjusted, unhappy, unstable, undependable individuals. If we feel sorry for them or despise them, we call them neurotics. If they make us angry, we call them psychopaths. If they rob or kill, we lock them up or execute them. If their behavior gets too far out of touch with reality, we call them insane and commit them to an asylum. We try to explain in terms of conflict, complexes and external environment why some people do what they should not or leave undone what they should do. We are, however, totally unable to explain why others with similar experiences and similar external environmental misfortunes do not display these aberrations of behavior. Too much attention has been paid to the external environment and too little to the internal environment. It is probably in the latter that we must seek for the final answer to the problem of adjustment and maladjustment, including addiction.

One of the abnormalities of the internal environment which already can be investigated to some extent is a condition usually described by the term "tension." Many persons who are misbehaving, who do not adjust to society or to themselves, are suffering from an undue amount of tension, and their misbehavior is, to a considerable degree, an attempt to relieve this tension It is closely associated with disturbances in homeostasis, and it is accompanied by what may be called physiological unhappiness. This arises from such somatic disturbances as pylorospasm, irregular heart action, tachycardia, gastrointestinal disturbances and the like. If these disturbances are severe enough or continued long enough, organic damage such as gastric ulcer or toxic goiter may result.

This combination of tension and disturbance in homeostasis (perhaps they are identical) is the mechanism which is referred to when people speak of the psychic or emotional origin of disease. It is, unless we accept metaphysical causation, based on physiological processes, the study of which we are already beginning to approach and which possibly can be brought under control.

When a tense, physiologically unhappy individual is accidentally initiated into the use of a substance which makes him less uncomfortable and if he should be a person with a weakly developed character, or one with a very low tolerance for either physical or mental discomfort, drug addiction may occur. This is, of course, not the whole story of the development of drug addiction. Like all biological phenomena, its causation is multiple. This is, however, probably one of the most common mechanisms for the continuation of and relapse to drug addiction.

It is generally believed that narcotic drug addiction arises as a result of one or several hypodermics given in the course of a disease or post-operatively. Our experience indicates that this accounts for a very small part of narcotic addiction. When a "normal" person, not suffering from pain, is given a dose of an opiate, the effect is unpleasant and distasteful. If a "normal" person suffers from a chronic painful condition for which opiates must be administered, and develops physical dependence, the result is not necessarily a narcotic drug addict. If his physical dependence can be relieved, the person is able to live without recourse to narcotics. If he suffers from marked tension in addition to the pain, and finds that opiates give him relief from his physiological unhappiness, he may be, as the addicts say, "hooked." When we think how many persons receive hypodermics of morphine post-operatively and how few become addicts, we can see the fallacy of the usually held belief.

The attempt at stabilization of the internal environment by the use of some substance or procedure is not basically wrong. If the practice used is harmless, much good is accomplished. Certain harmless, in fact helpful, procedures result in a lowering of tension and in decrease in physiological discomfort. For example, we have all experienced improvement in mental state and relief from tension following strenuous physical exercise. The external environment, the situation to which one has been reacting unfavorably, remains unchanged, but the internal environment has been stabilized, the tension has been relieved, and we have become at least less uncomfortable. As a very suggestive parallel to this, in producing the so-called neuroses in animals, it is necessary to restrict activity before the

abnormal behavior can be produced.

The use by man of various substances to make life less unpleasant is almost as old as is man himself. Opium, alcohol, tobacco, tea, coffee have all been used both in moderation and to excess by various ethnic and cultural groups. The problem of narcotic addiction is merely another aspect of this civilization-old practice of attempting to modify the internal environment so that life will be more endurable.

Since narcotic drugs differ from each other in their action, a resume of these types of action is indicated.

Morphine, heroin and related substances in addition to their analgetic action have a very marked tendency to quiet tension and to alleviate mental distress. Their action differs from that of alcohol in that there is not a release but an inhibition of activity. It is possible that this group acts primarily on the autonomic nervous system, in this way relieving the individual of his physiological discomfort and decreasing the urge to action.

Such drugs as papaverine and narcotine do not have such an action, do not cause physical dependence and addiction does not develop to them. Apparently their inclusion in the group of narcotic drugs was based on their derivation and not on their pharmacological action.

Cocaine is a "release" drug giving rise to hyperactivity of the lower brain centers with a tendency to paranoid delusions with strong reactions to them. Fortunately it is not much used at present. Our "normal" addicts look down on users of cocaine as real "hopheads" and very properly so.

Much concern is expressed by some people over the dangers of the use of marijuana. There has not yet been sufficient work done with an active principle of the hemp plant to justify this attitude. Much of the behavior attributed directly to the pharmacological action of the plant is probably, as with alcohol, due to the inhibitory action on the highest cortical centers. That is, when used by emotionally unstable, antisocial or inebriate persons, it will release antisocial behavior as a symptom of abnormal attitudes already present. Sometimes the use of the drug is the result, not the cause, of psychopathic attributes. So far as we know, it will not produce antisocial behavior in a reasonably well-adjusted person.

The work so far done suggests that tolerance develops relatively slowly for marijuana. Users of this substance usually limit themselves to a certain amount, not needing, as with the opiates, to increase rapidly the dosage to get the desired effect.

We have had no experience with peyote. It is a substance used principally by American Indians in the Southwest, apparently chiefly in connection with primitive religious ceremonies.

It can be seen that in general two types of drugs are included in the group of narcotics. One, the opium group, tends to quiet and allay and postpone activity including the anti-social. The members of the other group, cocaine, marijuana and possibly peyote, act to release repressed tendencies and to create disturbing and anti-social activity in those who are basically anti-social. The action of the second group, as it can be seen, resembles to a considerable degree that of alcohol.

It is interesting to contrast the effects of alcohol and morphine. The man who is a murderer in his heart may commit murder under the influence of alcohol, but under the influence of morphine, he will postpone action. A number of cases are on record of extremely psychopathic individuals, chronic alcoholics, becoming fairly good citizens, well behaved and orderly after they became addicted to morphine. To phrase it another way, the alcoholic gets drunk and comes home and beats his wife. The addict to an opiate gets "high," comes home, and his wife beats him.

There is a widely held belief that the use of opium and its derivatives produces antisocial behavior. There is no evidence that opiates in themselves conduce to crime except the crimes necessary to finance a habit and to obtain the drug. Narcotic addicts, of course, accumulate long criminal records; in most cases, however, these are the inevitable result of the fact that the traffic in the drug is illegal.

It is true that some professional criminals also are narcotic drug addicts. This cannot be causally related to the use of drugs. In most cases the criminal career antedated the development of the drug habit and usually is much hampered by it. A significant fact is that the "big shot" criminals of the country will not use addicts in their operations.

How much *irreversible* damage is done by

the use of opiates is not clear. Changes, the exact character of which has not yet been formulated, are produced, as is evidenced by the withdrawal syndrome. Many persons are able to use these drugs over long periods without demonstrable permanent physical damage. Marijuana produces temporary psychoses in unstable persons. How much permanent damage is actually done to the user, aside from the dangers to him and his associates from loss of control, is not clear. So far no evidence of irreversible damage to the nervous system has been found.

Brain damage from the use of cocaine has been reported. Since this work was done before we knew that avitaminosis could produce irreversible brain damage, it may be, as with much of the harmful effects of alcohol, lack of essential substances, not direct toxic action, produces the reported changes.

It must not be understood that the writer holds a brief for the use of narcotic drugs, particularly opiates. Their use is dangerous, more so than that of many other drugs and for two reasons. These are: (1) the rapid development of tolerance and (2) the parallel development of physical dependence. The result of these two factors leads, in most cases to a rapid increase in dosage and a necessity for maintenance of dosage. The chronic alcoholic can, and frequently does, stop drinking without becoming physically ill. This the opiate addict cannot do even for one day. He is tied to his habit by physiological bounds. He knows that to break off the use of his drug will entail severe physical suffering, and he will go to considerable lengths in order to secure a continuous supply. Since he knows what suffering he will face if he discontinues, it is almost impossible for the usual type of addict to get rid of his physical dependence without assistance.

The treatment of narcotic drug addiction falls into four main categories. These are as follows: (1) control of the addict, (2) relief of physical dependence, (3) correction of emotional and social maladjustment, and (4) placement after discharge and proper follow-up.

Control of the narcotic addict is essential for successful treatment. No matter how cooperative he may intend to be, the period of the treatment of physical dependence and of readjustment to life without the use of narcotics is so trying that many narcotic addicts are unable to go through it voluntarily. By control is meant, of course, that the patient must be locked up. This does not necessarily mean in prison or other correctional institution. Treatment can be carried out in a public or private hospital if a section of the institution is set aside for the purpose and staffed with people who understand the problems of narcotic drug addiction. Even here the problem of legal control arises, since, unless the patient can be held in some way against his will, he will probably discontinue the treatment. Unfortunately, society has not yet worked out a kind method of controlling the narcotic addict for purposes of cure. It is frequently necessary to make a felon out of him before proper control can be instituted.

After he is within the controlled environment, his physical dependence must be relieved as safely and as humanely as possible. Sudden and complete withdrawal of the drug is not advisable. It is true that young, vigorous, healthy individuals can go through the agonies of the abstinence syndrome and survive. However, if our object is to treat sick people, not to punish those whom we regard as wicked, our aim should be to reduce discomfort to the minimum. In addition, the rapport of the addict with society and his desire and ability to remain abstinent are not increased by this experience. Then, too, ailing individuals, especially those suffering from cardiovascular or pulmonary disease, may not survive—or, if they do so, may sustain serious damage.

The transition from a life with morphine to one lived without it is fraught with dangers beyond those of withdrawal. The nature of these dangers we do not fully understand, but the results of them we can observe. To illustrate this, twenty-five per cent of all the deaths in our institution occur in the first forty-five days of hospitalization. The average stay in the institution is fourteen months. It can be seen that the number of deaths in this first month and a half is far beyond the expectation. These were not deaths occurring in the acute abstinence period. About half of them were due to chronic cardiac disease or to pneumonia. It behooves us then to think and observe carefully how we are going to handle the addict during this transition period which begins at the time the drug is

discontinued and lasts for between one and a half and two months—perhaps longer.

The first question we must answer in treating physical dependence is whether the drug is to be completely discontinued. If the patient is dying of tuberculosis or is in a far-advanced stage of cardiac disease with decompensation, deprivation of morphine will almost certainly cause death. There are many other conditions for which sound medical practice indicates the prolonged administration of opiates. The amount being used by the patient, especially if he has not been under control, can nearly always be reduced, but one must always remember that it is not a crime to give an addict a hypodermic of morphine. What is forbidden is to continue to support physical dependence over and above the analgetic needs of the individual, if these exist.

A fairly simple way to handle a rather marked degree of physical dependence is as follows: When the patient is admitted, no drugs are administered until definite signs of the abstinence syndrome appear. Then, by a little experimentation with dosage, it can quickly be found how much morphine will just prevent the development of the abstinence syndrome. In most cases not more than a half grain every four hours will be needed. The various examinations are then conducted and the patient's history and physical examination completed. Usually careful study of the patient will take approximately a week. During this period of "stabilization" as we call it, special attention must be paid to the possibility of subclinical avitaminosis. Dried brewer's yeast and orange juice or some other polyvitaminotic preparation should be administered routinely. If specific deficiency is suspected, intensive treatment, preferably parenterally, should be administered.

If it is found at the completion of the study that there is no serious contra-indication to discontinuing the opiate, its administration is abruptly stopped. About nineteen hours later if there is a rather marked abstinence syndrome one "stabilization" dose of morphine is given. Half of this may be given at the 36th hour and a quarter at the 48th hour. After this an occasional dose of codeine may be given for one or two days. Beginning at the time of withdrawal, bromides may be given for not more than two days. An ice cap to the throat gives some relief from vomiting. Warm baths, followed by massage, relieve restlessness. If the gastro-intestinal symptoms are severe, one or two doses of a quickly acting barbiturate may be given.

Since the acute stage of the withdrawal will last only a few days, nutrition as a caloric problem need cause no concern. Fluid loss may be great, and dehydration must be prevented. Fluids and fruit juices will usually be taken. Adequate vitamins must be given, preferably parenterally. Normal saline by vein is indicated if there is inadequate fluid intake or if vomiting or diarrhea are persistent. Hypertonic glucose solutions intravenously frequently give marked relief.

One should never be slavishly bound by any particular routine. Especially should one administer morphine promptly and in adequate dosage if severe abstinence signs—especially those indicating collapse—appear.

Usually about ten days is long enough to relieve physical dependence as evidenced by frank signs and symptoms. Our disproportionate death rate during the early period of hospitalization, however, suggests strongly that the patient is in a vulnerable condition for several months. Careful attention, therefore, should be paid to health and nutrition for a considerable time.

The difficult part of the program is character rehabilitation, the process of making the addict willing and able to live without narcotic drugs. Many are willing. Failures are often due to an inability to face, without resorting to drugs, their physical or mental handicaps.

Like the treatment of all personality maladjustments, a multiple approach to the problem must be employed. It must necessarily be empirical since we are not able to formulate the exact character of the defect which leads to addiction and are therefore not able to attack it directly.

Remediable physical defects should be corrected, intercurrent disease treated, emotional problems aerated, family difficulties studied and corrected insofar as possible and an attempt made to find what leads the patient to feel that he needs narcotics.

Time is an important factor, time to permit the conditioned response of using a drug or needle every time one feels unhappy to become extinguished or to become weak enough so that the patient can control it. A well regu-

lated, orderly life with interesting work and sufficient amount of recreation is probably one of the most important factors in rehabilitation. At the hospital at Lexington, we are fortunate in having a widely diversified range of activities, all of which, under supervision, are operated by our patients. For example, there is a farm, a clothing factory, a furniture factory, and all of the activities having to do with the maintenance of a large institution, ranging from janitor work for the simple type of individual to highly technical work in the research department or in connection with complicated electrical apparatus.

The length of treatment should be from six to nine months in the hospital, with the opportunity (or compulsion) to return for additional periods of observation or treatment. We feel that, after — in most cases — nine months, the patient should have the opportunity to demonstrate to society that he has regained the power of self-control, or to himself that he has not.

Most of the patients at the Lexington Hospital are prisoners serving a definite portion of a sentence and cannot be discharged until this has been completed. Others are volunteers and can leave when they wish. Only with probationers, i.e., persons sentenced for violation of a Federal statute, whose sentence has been suspended under condition that they come to the hospital for treatment, can we discharge them when we feel that the optimum time has arrived.

Placement in society offers considerable difficulty, not because the addict is unable to become a productive unit, but because people in general regard him as incurable, unreliable, and prone by reason of the effect of the drug to crimes of violence or of perversion. This attitude, well known of course to addicts, has the doubly harmful effect of discouraging the addict and making it difficult for him to obtain and hold employment commensurate with his ability. When we can place the patient in a friendly and stimulating environment, or when he has such an environment to return to, the outlook is favorable. When, due to inability to secure suitable placement, he must go out to a bad environment and come in contact with his former addict associates, when only uncongenial, unsuitable and perhaps poorly paid work can be obtained, the prognosis naturally is poor.

Follow-up studies on 4,766 patients out of the hospital from nine months to five years show the following:

Abstinent from drugs	13.5%
Relapsed	39.9%
Dead	7.0%
Unknown	39.6%

The majority of these persons (74.9%) were prisoners or probationers. If any of these get into any sort of difficulties with the law, Federal or State, their fingerprints are sent to the Federal Bureau of Investigation, a report is sent to us and they cease to be classed as unknown. We can then consider that a considerable portion of the "unknown" have been cured, in that they have regained sufficient self-control to keep out of any legal difficulties.

In conclusion, it must be emphasized that narcotic drug addicts do not differ in kind from the neurotics and psychopathic personalities who form the bulk of the non-psychotic clients of the psychiatrist or neurologist. Their behavior patterns have been modified to some extent by their desire to obtain drugs, to a very large extent by the fact that they have been treated as criminals and locked up with the professional criminals where frequently they have acquired a prisoner attitude. We consider that basically a narcotic drug addict is an ill person who has accidentally been exposed to the use of a narcotic, has found this is a temporary answer to his difficulty and has then gone through a secondary social regression or degradation due to the fact that he has had to connive and deceive and lie, associate with members of the underworld and try to avoid, more or less unsuccessfully, arrest and conviction in order to maintain his dosage of drugs. We must never forget that if the poppy plant or marijuana had never been grown, if alcohol had never been manufactured and if the various drugs used by other types of addicts had never been discovered or synthesized, these people would still be problems to someone. Addiction to drugs merely complicates and obscures the basic problem of somato-psychic illness. When we can approach objectively the study and treatment of the basic personality defect, the prevention and cure of narcotic drug addiction will be simplified.

Neurological Clinical Pathological Conference

of the

Cincinnati General Hospital

CHARLES D. ARING, M.D., *Editor*

(CASE NO. 7792)

Presentation of Case

A 43-year-old white policeman, the father of two children, was admitted to the Neurological Service on May 26. During the previous August, while in uniform he had precipitously left for Florida without a word to his family or to his superior officers. As a result he was suspended from his post and placed at a desk job which he disliked.

About mid-November, shortly after he had been bitten in the right upper extremity by a prisoner, he began to have the attacks which recurred until his admission to the hospital. The attacks occurred as often as twice a week and as infrequently as once every three weeks. He was awakened by a nocturnal attack on one occasion.

About 15 minutes preceding an attack he would notice "twitching of one or the other eye," which resulted in diplopia. Attacks were described briefly as follows: (1) numbness extending from the elbow to the fingers or to the shoulder of either upper extremity singly, (2) weakness of the right or left side of the face or of both sides, with slobbering, inability to talk or to swallow, (3) weakness of one or both sides of the face and simultaneously of the right upper extremity, or (4) dizziness and generalized weakness. When the face was involved it would become rigid and twitch, and he was unable to open or close the mouth; he had no control of the face or of the tongue; he couldn't speak, and it felt as though he had swallowed his uvula. When there was involvement of the right upper extremity he would be unable to release the grasp of the right hand. Numbness followed in whatever part was involved by the motor phenomena.

None of the attacks caused him to fall or lose consciousness, or to lose sphincter control. After the cessation of an attack he was completely fatigued and had to rest until strength returned. On May 24, two days before his admission to the hospital, he suddenly developed weakness in his right extremities which progressed over 48 hours to complete paralysis, with aphasia an accompaniment.

The family history contributed nothing of importance to the diagnostic problem. The past history was replete with traumatic episodes, usually involving his work as a motorcycle policeman. Twenty-six years previously he sustained a fracture of the right femur, 21 years before, a fracture of the right radius, 13 years back, a fracture of the skull, and later in the same year a fracture of the first lumbar veterbrae, 10 years ago a fracture of the mandible, proximal phalanges of first and fourth fingers on the right, of two ribs on the left and an evulsion fracture of the right scaphoid bone (the injuries sustained when he drove his motorcycle head-on into an automobile), 6 years previously a partial amputation of the distal phalanx of the second finger of the left hand, and 2 years before admission he sprained the right wrist when he "slipped and fell." The record contained the note that he had been unconscious an indefinite number of times and intimated that unconsciousness accompanied by many of the injuries.

Most of these injuries were cared for at this hospital. A casual note was made nine years before that the posterior tibial arteries showed unusual sclerosis. At that time the blood pressure was 132/94. The patient had had headaches frequently for many years. Usually they were localized in the inferior occipital region and radiated across both shoulders. The pain when it occurred was described as a steady ache. For nine years there had been some shortness of breath on exertion. Over the past three years he had progressively developed sexual impotence. Psoriasis of the right ear was noted three years ago. Two months before admission he had been described as an overly talkative person.

Examination—Weight was 210 pounds, temperature, pulse, and respiration were normal; blood pressure 130/80. The lesions of psoriasis were scattered over the body. He had always

been righthanded. Abnormalities were confined to the neurological examination and were: practically complete loss of ability to speak, his responses were confined to the answers, "all right" and "yeah;" bilateral ptosis, flaccid paralysis of the right limbs and lower portion of the right face, exhaustion of the right abdominal and cremasteric reflexes, the right tendon reflexes were somewhat more active than the left, weak right Hoffmann, bilateral Babinski, Chaddock, and right Oppenheim and Gonda responses. He was alert and attempted to cooperate. He seemed confused and yawned frequently. He appreciated pinprick in all extremities and on both sides of the face.

Course—The first return of speech was profanity. On May 29 he began to answer questions slowly and sometimes would whistle in response to questions. He was restless, yawned frequently and there were periods when he was listless and drowsy. He gradually became more restless and noisy. The right extremities were noted to demonstrate increased resistance to passive movement on June 6. At that time he perseverated with the phrases or words that he had. The plantar responses remained bilaterally extensor throughout his course.

He had periods of vocalization which resembled "forced speech," in which he would emit staccato bursts of "oh, oh, oh, oh," etc., at the rate of about 80 per minute. The episode would last for several minutes and ended in a drawn-out, quavering "oh-h-h- . . ." He replied that he was unable to control these outbursts which occurred day and night until he became moribund on June 28. He appeared tense and worried, and was flushed and perspired during the vocalization. At times a few clonic muscle twitches were seen in the right side of the face preceding or coincident with the vocal outburst. The administration of 4½ grains of dilantin daily did not alter the incidence of vocal outbursts. Considerable sedation (paraldehyde, phenobarbital, chloral hydrate, sodium bromide) was administered daily between June 7 and June 26. Isolated and sometimes periodic twitches were seen occasionally in muscle groups of the right extremities, particularly in the triceps and quadriceps.

On June 12 formal tests of aphasia were attempted. He identified a key, a book of matches and a 25-cent piece correctly. He called a watch a penknife. He identified a key placed in the left hand. He then had a machine gun-like outburst of "ohs." He became apprehensive and agitated, grabbed at the examiner with his left hand. He perspired profusely. He then varied the "oh" series with repetition of another word, a word which had been uttered by the examiner. After the bout which lasted about two minutes, he couldn't answer why he had had this manifestation. He said "no" to inquiries about pain, or whether he desired anything. The aphasia test was then continued. He gave his address correctly; named the President and the hospital. He could not name the day, month, year, or the preceding presidents. Ten minutes after the exclamatory outburst he said that he was afraid, then he said, "I don't realize, I don't know."

His condition continued unchanged. Short periods of twitching were seen repeatedly in the right extremities. Sometimes he would spend the entire night in vocal outbursts. Drenching perspiration soaked the bed despite a normal body temperature and relatively comfortable weather. He would maintain a puzzled expression between the vocal bouts. His right limbs became increasingly spastic, the upper was held flexed against the chest, the lower rigidly extended.

On June 25 the temperature and pulse and respiratory rates began to ascend. The next day the patient appeared exhausted. Cheyne-Stokes respiration developed. He continued the vocal outbursts in a low, hoarse voice until the morning of June 28. He became stuporous on June 29 when his temperature had reached 104^8 degrees F. (rectal), the pulse rate 168, and the respiratory rate 60. He died on June 30, on the 36th hospital day.

Laboratory Data—The routine blood examinations were normal. The white blood count rose to 15,200 on June 29. Repeated urinalyses were normal except for the appearance of sugar on two occasions (June 7, June 19). The blood pressure was 132/94 nine years ago, 130/90 three years ago, and 140/110 two months before admission. On the admission examination of May 26 it was 130/80, on May 28, 150/110; May 29, 130/90; May 30, 150/115; June 2, 150/90; June 7, 150/110; June 11, 145/90; June 15, 140/90. Blood Kahn and Wassermann tests done repeatedly over nine years

were negative. An electrocardiogram done on June 1 was normal. Fasting blood sugar on June 8 was 102 mg. per 100 cc., CO_2 combining power 50 volumes per 100 cc., and similar figures were obtained on June 10. On June 30 the urea nitrogen was 43 mg. per 100 cc.

Visual field tests done on June 3 with imperfect cooperation revealed no abnormality. Three analyses of the cerebrospinal fluid were normal except for increase in the total proteins, 46, 77, and 60 mg. per 100 cc. Colloidal gold curves and CSF Wassermanns were normal. Skull plates on May 29 and a helium encephalogram on June 1 were normal. Three electroencephalograms were recorded. On March 31 a six lead monopolar study revealed no abnormality. On May 29 and on June 12 six lead monopolar and eight lead bipolar studies showed diffuse, severe cerebral dysrhythmia.

Differential Diagnosis

By Doctor John Romano:

In summary, we have a 43-year-old man with the history of numerous traumas and headache, who had mild hypertension, had been somewhat short of breath in the past, and who had experienced sexual impotence and psoriasis. Ten months before death he suddenly and unexplainably went to Florida, seven months before death he had numerous attacks involving both left and right sides, more right-sided than left-sided; and weakness. Three months before death it was noted that he was overly talkative. One month before death, an ictus resulted in aphasia and right hemiplegia. He improved somewhat, having outbursts of forced speech. Five days before death he developed fever, Cheyne-Stokes respiration, fast pulse, and leukocytosis.

What happened to this man? Significant factors in the past history were the numerous traumas experienced, which may or may not have been associated with unconsciousness; headache, unusual sclerosis of the posterior tibial artery, and the fact that he had some degree of hypertension. He did not have arteriolonephrosclerosis, cardiac or renal disease. Did this person have luetic vascular disease of the brain? This diagnosis would be a guess. There was no past history of syphilis and no evidence of it in the blood or CSF. I think it very unlikely that this was dementia paralytica. Did he have a type of cerebral arteriosclerosis, and what about neoplasm? The bilaterality of signs may have been due to a gliomatous process which infiltrated on both sides diffusely, but it seems to me in an active course of eleven months or even of six months he should have had a greater protein content or pressure reaction in the CSF. A subdural hematoma of thirteen years standing might be considered, but it should have produced some type of ventricular distortion even after a considerable number of years. There was no evidence of an inflammatory process. The relative freedom between the attacks over periods of months would rule this out. Degenerative processes such as true senile dementia should be ruled out, since he wasn't demented; he was fairly intact prior to the ictus except for attacks. Pick's or Alzheimer's disease may be invoked by seizures of some kind or other. I should think it more likely to find a greater degree of cerebral atrophy in Pick's disease; in Alzheimer's disease one would expect more dementia. The course was episodic, not steadily progressive. I mention parasitic disease only to dismiss it.

Was this disease of vascular origin? If it were malignant nephrosclerosis with some arterial involvement of kidneys and brain one would expect higher arterial tension and certainly more changes in the CSF at some time during the course. Another possibility is cerebral arteriosclerosis in association with small artery involvement, characterized by involvement of media and intima; in other words, senile sclerosis, or Monkeberg's sclerosis in which there is involvement of the media and replacement of the muscle tissue by calcium.

It is possible that this man had generalized arteriosclerosis, which may explain the hypertension, artery sclerosis in the leg, and headache. He had a cerebral thrombosis in May, two days before entry, an irreversible lesion with aphasia and right hemiplegia. This diagnosis is compatible with the CSF findings. I think he probably had diffuse arterial disease involving the brain, particularly the left middle cerebral artery. Pre-senile dementia would fit the time element, but the episodic course and intactness of the patient's intellect would rule this out.

Clinical Diagnosis—Cerebral arteriosclerosis with multiple areas of softening; thrombosis, left middle cerebral artery.

Doctor Romano's Diagnosis—Cerebral arteriosclerosis with multiple areas of softening; thrombosis, left middle cerebral artery.

Anatomical Diagnosis — Diffuse thromboangiitis obliterans of the brain.

Pathological Discussion

By Doctor I. Mark Scheinker:

Gross examination of the brain revealed the presence of diffuse areas of atrophy and small softenings over both hemispheres. In gross the small areas of softening seemed to be confined to the white matter, but microscopic examination revealed lesions within the cortical ribbon as well. The disease was diffusely widespread, more in the left than in the right hemispheres, and most in the left frontotemporal region.

Microscopic examination showed involvement of the vascular system and of the parenchyma of the brain. The vascular lesions are of greater interest. The lesions farthest advanced were represented by vessels partly occluded by a mass of granulation tissue, composed of fibroblasts and connective tissue fibrils. This mass was the cause of the narrowing of the lumina and was due to the proliferation of the intima, particularly of the subendothelial part of the intima.

Many larger vessels were partly occluded by the proliferated intima and an accompanying thrombus formation. Complete occlusions of the lumen occurred often and then the contiguous brain parenchyma was destroyed and replaced by gitter cells. These changes were widespread in the cortex and white matter throughout the cerebral and cerebellar hemispheres and the brain stem.

Scattered throughout both hemispheres were lesions of different ages, roughly indicative of their period of development. The oldest were small areas of glial scar formation.

We are dealing here with thromboangiitis obliterans, first described in the lower extremities (Winiwarter) in 1879. Since 1906 Burger has accumulated much material on this disease, well over 500 cases. This vascular disease is well known in peripheral vessels, but not common in the central nervous system. Only recently has it been recognized that comparable lesions may be produced in the brain.

The question of pathogenesis is much disputed. In this clinic we have been studying the possible origin of the vascular lesion. Is the proliferation of the intima secondary to infectious process, as has been the opinion of Burger? Winiwarter disagreed with this point of view and thought the disease was a primary proliferation of the intima without any evidence of an inflammatory process.

We can find no evidence of inflammatory disease. We had searched for and studied the early lesions minutely. The intimal proliferation is the late stage of the disease. It is difficult to gain much information from scar formation. In the vessels which showed relatively early changes we see intramural hemorrhages, an accumulation of blood between the intima and media. We found many vessels which showed this lesion. The hemorrhage could be seen in the stage of histiocyte formation, these cells being filled with blood pigment. In a later stage the intima continues to proliferate and occupies more of the vessel lumen. The lesion is cellular, but has not yet formed a scar.

The tibial vessels were not examined in this case since Burger's disease was not suspected. The general autopsy showed a moderate degree of generalized arteriosclerosis. In one of the coronary arteries there was a similar process to that found in the brain. Our impression is that we are dealing with a primary intimal proliferation with narrowing of the lumina, and multiple softening of the brain. This condition differs from cerebral arteriosclerosis in these respects: (1) The proliferated intima in cases of endagiitis obliterans is a cellular tissue which shows very little or no degenerative change. In cases of arteriosclerosis the proliferated intima is markedly degenerated and acellular; (2) Whereas the splitting off and early degeneration of the elastic membrane forms one of the outstanding features of the arteriosclerosis, it does not occur in cases of endangiitis obliterans; and (3) even more striking is the fact that the pathologic process in endangiitis obliterans seldom extends beyond the intima. In arteriosclerosis the process involves both the intima and the media.

Doctor Charles D. Aring:

Nine years ago, when this patient was seen in Surgical Clinic incident to treatment of one of his fractures, the house officer referred this case for vascular study because of the

severe degree of sclerosis of the posterior tibial artery. At that time a note was made that there appeared to be no vascular insufficiency in the legs. Of course, one may have sclerosis in the arteries in the limbs without visual evidence of vascular insufficiency.

The disease must have begun between the ages of 20 and 30. One can't explain how an experienced cycler could run head-on into so many objects as did this man unless he was losing consciousness. I think that for years he was suffering from episodes of syncope or more likely of convulsions. A differential diagnostic point to be made in this case is the fact that a stroke occurring below the age of 50 is usually due to hemorrhage, unless syphilis is a factor. It was obvious clinically that this man did not have a hemorrhage. Persons with thrombosis of the larger arteries regain equilibrium quickly and may walk again, even though the thrombosis be of a major vessel. This man continued with episodic outbursts, which we think were probably of the nature of convulsion. The onset of the acute symptoms began about seven months before his death, and progressed relentlessly thereafter. This is not the case in the patient with the usual type of cerebral thrombosis.

By Doctor Eugene B. Ferris: In diffuse types of cerebral arteriolar sclerosis as in coronary sclerosis, is there a tendency to thrombosis which may obstruct blood vessels?

Doctor Scheinker: Usually not, and the reason is because the intima is not affected. As long as the intima is intact, it is unusual to have thrombosis.

By Doctor Harry M. Salzer: Is there change in the midbrain to account for the ptosis?

Doctor Scheinker: The changes were generalized throughout the nervous system.

Doctor Romano: How often do you see Burger's disease without involvement of the veins?

Doctor Scheinker: In the extremities the arteries are mostly involved, with gangrene the result. As far as I know, the arteries are the most involved in the brain. The veins do not appear to have been involved.

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Book Reviews

PAIN MECHANISM, by W. K. Livingston, Lieutenant Commander, M.C., USNR, The MacMillan Co., New York, 1943, pp. 253. Illus. $3.75.

Dr. Livingston has set down in easily readable form an excellent review of the outstanding literature on pain mechanisms, as well as his own personal observations and interpretations of unusual pain syndromes that he has gleaned from his experience with the Oregon State Industrial Accident Commission.

In the first section, he deals primarily with the anatomy, physiology and psychology of pain, with a brief review of various concepts of pain.

The second section is devoted to clinical syndromes with case history presentations followed by discussion of those various states that are so distressing to the average practitioner, i.e., causalgia states, low back pain, facial neuralgia, and phantom limb pain.

In section III, he attempts to interpret his various observations and findings.

Not the least valuable part of this work is the complete bibliography.

Since most of his concepts are still in the controversial stage, it is doubtful if this book would be of much value to the average medical student, but on the other hand, the general practitioner, and especially the surgeon and psychiatrist will find much of interest and value in its pages.

BEHAVIOR AND NEUROSIS: An experimental psychoanalytic approach to psychobiologic principles, by Jules H. Masserman, Chicago, 1943, Univ. of Chicago Press, pp. XV-269. 6 illus.

Using a complicated but superbly controlled experimental technic on cats, Masserman has produced reactions that are strictly comparable with human neuroses. In essence the technic is that employed in the study of conditioned reflexes, but additional factors are introduced as a result of the author's acquaintance with concepts of motivation and frustration as established by psychoanalysis.

Thus, simple frustration is incapable of producing neurotic behavior. However, setting up a conflict between drives of almost equal strength but opposite "signs" yields a rich symptomatology of neurotic behavior.

Specifically, when a hungry cat was exposed

at the moment of feeding to a blast of air or an electric shock, the feeding behavior was arrested and many persistent side reactions of a neurotic character were engendered. Naturally, these reactions were limited by the natural limitations of feline behavior. As the author states, "Although the patterns of these phenomena are highly suggestive of their more persistent and elaborately symbolic counterparts in the human, nevertheless, no cat that I have observed thus far has had the imagery to solve its anxiety by strutting, growling or dressing like Mussolini in over-reaction to feline feelings of frustration and inferiority."

Masserman points out the characteristics of such neurotic behavior in the cat: Changes in spontaneous activity, phobic responses, counterphobic behavior patterns, regressive behavior and so on. These deviations are illustrated in several series of photographs made from motion picture films. (Incidentally, these films are available for the serious student upon application to the University of Chicago.) The author demonstrates conclusively that the neurotic behavior is a total reaction and not due to a local disturbance in the brain. Direct stimulation of the hypothalamus elicits the somatic expression of fear, but does not interrupt even the taking of food by the animal.

In a further series of experiments Masserman also demonstrates that his "neurotic" animals can be "cured" (the author is guilty of false modesty in the frequent use of quotation marks) by such standard psychotherapeutic procedures as rest, reduction in intensity of the conflictful hunger drive, reassurance, suggestion, transference technic, forced solution, social imitation, and working through of the neurosis-producing situation.

There is a long list of references. The author has drawn upon many fields of investigation in the present study, behaviorism, conditioned reflexology, psychobiology, neurophysiology and others, and the book does not read easily because of the frequent quotations from the many authors and the rather esoteric vocabulary that they employ. Masserman himself seems to enjoy inflicting upon his less learned colleagues many terms such as heuristic, eschatological, and so on, but this also may be a companion piece to the meticulousness of his experimental studies.

This volume represents a brilliant contribution to the study of neurotic behavior.

Walter Freeman.

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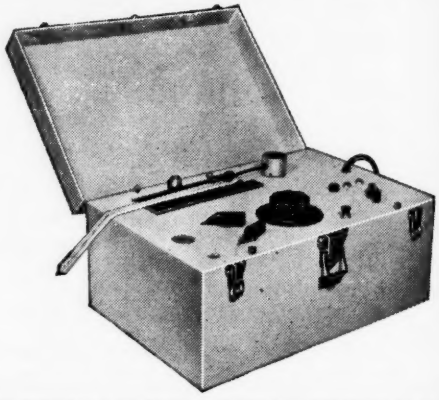

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